

## BMP-35

### BMP: MULCHING

#### Definition

Application of plant residues or other suitable materials to the soil surface.

#### Purposes

1. To prevent erosion by protecting the soil surface from raindrop impact and reducing the velocity of overland flow.
2. To foster the growth of vegetation by increasing available moisture and providing insulation against "extreme heat and cold.

#### Conditions Where Practice Applies

1. Areas which have been permanently seeded (see BMP-32, PERMANENT SEEDING) should be mulched immediately following seeding.
2. Areas which cannot be seeded because of the season should be mulched to provide some protection to the soil surface. An organic mulch should be used, and the area then seeded as soon weather or seasonal conditions permit. It is not recommended that fiber mulch be used alone for this practice; at normal application rates it just simply does not provide the protection that is achieved using other types of mulch.
3. Mulch may be used together with plantings of trees, shrubs, or certain ground covers which do not provide adequate soil stabilization by themselves.
4. Mulch shall be used in conjunction with temporary seeding operations as specified in TEMPORARY SEEDING, BMP-31.

#### Planning Considerations

Mulches are applied to the soil surface to conserve a desirable soil property or to promote plant growth. A surface mulch is one of the most effective means of controlling run-off and on disturbed land.

Mulches can increase the infiltration rate of the soil, reduce soil moisture loss by evaporation, prevent crusting and sealing of the soil surface, modify soil temperatures, and provide a suitable microclimate for seed germination.

Organic mulch materials, such as straw, wood chips, bark, and fiber mulch have been found to be the most effective.

Chemical soil stabilizers or soil binders should not be used alone for mulch. These materials are useful to bind organic mulches together to prevent displacement.

A variety of manufactured SOIL STABILIZATION BLANKETS AND MATTING (see BMP-36) have been developed for erosion control in recent years. Some of these products can be used as mulches, particularly in critical areas such as waterways. They also may be used to hold other mulches to the soil surface.

The choice of materials for mulching will be based on the type of soil to be protected, site conditions, season and economics. It is especially important to mulch liberally in midsummer and prior to winter, and on cut slopes and southern slope exposures.

#### Organic Mulches -

**Straw** - The mulch most commonly used in conjunction with seeding. The straw should come from wheat or oats (free of troublesome weed seeds) and may be spread by hand or machine. Straw can be windblown and must be anchored down by an acceptable method.

**Hay** - May be used in lieu of straw where volunteers will not present a problem, and may be spread by hand or machine. Hay can be windblown and must also be anchored or tacked down.

**Corn Stalks** - These should be shredded into 100 to 150 millimeter (4 to 6 inch) lengths. Stalks decompose slowly and are resistant to displacement.

**Wood Chips** - Suitable for areas that will not be closely mowed, and around ornamental plantings. Chips decompose slowly and do not require tacking. They must be treated with 6 kilograms of nitrogen per 1000 kilograms of chips (12 pounds per ton) to prevent nutrient deficiency in plants; however, can be a very inexpensive mulch if chips are obtained from trees cleared on the site.

**Bark Chips, Shredded Bark** - These are by-products of timber processing which are used in landscaped plantings. Bark is also a suitable mulch for areas planted to grasses and not closely mowed. It may be applied by hand or mechanically and is not usually toxic to grasses or legumes; additional nitrogen fertilizer is not required.

Fiber Mulch - Used in hydroseeding operations and applied as part of the slurry. It creates the best seed-soil contact when applied over top of (as a separate operation) newly seeded areas. These fibers do not require tacking, although tacking agents or binders are sometimes used in conjunction with the application of fiber mulch. This form of mulch does not provide sufficient protection to highly erodible soils. Additionally, fiber mulch will not be considered adequate mulch when used during the dry summer months or when used for late fall mulch cover. Use straw mulch during these periods. Fiber mulch may be used to tack (anchor) straw mulch. This treatment is well suited for steep slopes, critical areas, and areas susceptible to displacement.

There are other organic materials which make excellent mulches but are only available locally or seasonally. Creative use of these materials can reduce costs.

#### Chemical Mulches and Soil Binders -

A wide range of synthetic, spray-on materials are marketed to stabilize and protect the soil surface. These are emulsions or dispersions of vinyl compounds, rubber or other substances which are mixed with water and applied to the soil. They may be used alone in some cases as temporary stabilizers, or in conjunction with fiber mulches or straw.

When used alone, chemical mulches do not have the capability to insulate the soil or retain soil moisture that organic mulches have. This soil protection is also easily damaged by traffic. Application of these mulches is usually more expensive than organic mulching, and the mulches decompose in 60-90 days.

#### Blankets and Matting -

Field experience has shown that plastic netting, when used alone, does not retain soil moisture or modify soil temperature. In some cases it may stabilize the soil surface while grasses are being established, but is primarily used in grassed waterways and on slopes to hold straw or similar mulch in place.

Jute mesh and other soil stabilization blankets are good choices for mulching on difficult slopes and in minor drainage swales. Most of the soil stabilization mattings (used to create a permanent matrix for root growth within the soil) must receive mulching in order to properly stabilize an area. Notably, some manufacturers have recently developed permanent mattings which include self-contained, temporary mulching materials; however, these measures will have to meet the requirements noted in BMP-36, SOIL STABILIZATION BLANKET'S AND MATTING, before they can be recommended for use on steep slopes and in channel flow situations.

The most critical aspect of installing blankets and mats is obtaining firm continuous contact between the material and the soil. Without such contact, the material may fail and thereby allow erosion to occur. It is important to use an adequate number of staples and make sure the material is installed properly in order to maximize soil protection. These products are discussed in more detail in BMP-36, SOIL STABILIZATION BLANKETS & MATTING.

### Specifications

#### **Mulches -**

Organic mulches may be used in any area where mulch is required, subject to the restrictions noted in Table 35-1.

**Materials:** Select mulch material based on site requirements, availability of materials, and availability of labor and equipment. Table 35-1 lists the most commonly used organic mulches. Other materials, such as peanut hulls and cotton burs, may be used With the permission of the local Plan-Approving Authority.

**Prior to mulching:** Complete the required grading and install needed sediment control practices.

Lime and fertilizer should be incorporated and surface roughening accomplished as needed. Seed should be applied prior to mulching except in the following cases:

- a. Where seed is to be applied as part of a hydroseeder slurry containing fiber mulch.
- b. Where seed is to be applied following a straw mulch spread during winter months.

**Application:** Mulch materials shall be spread uniformly, by hand or machine. When spreading straw mulch by hand, divide the area to be mulched into approximately 100 square meter (1,000 square feet) sections and place 34-44 kilograms of straw in each 100 square meter section to facilitate uniform distribution (70-90 lbs of straw per 1,000 square foot section).

**Mulch Anchoring:** Straw mulch must be anchored immediately after spreading to prevent displacement. Other organic mulches listed in Table 35-1 do not require anchoring. The following methods of anchoring straw may be used:

**TABLE 35-1**  
**ORGANIC MULCH MATERIALS AND APPLICATION RATES**

MULCHES	RATES		NOTES
	Kilograms per 1,000 sq. meters	Pounds per 1000 sq. feet	
Straw or Hay	340 - 440 kg	70 - 90 lbs.	Free from weeds and coarse matter. Must be anchored. Spread with mulch blower or by hand.
Fiber Mulch	170 kg	35 lbs.	Do not use as mulch for winter cover or during hot, dry periods.* Apply as slurry.
Corn Stalks	905 - 1,345 kg	185- 275 lbs.	Cut or shredded in 4-6" lengths. Air-dried. Do not use in fine turf areas. Apply with mulch blower or by hand.
Wood Chips	905 - 1,345 kg	185 - 275 lbs.	Free of coarse matter. Air dried. Treat with 12 lbs nitrogen per ton. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
Bark Chips or Shredded Bark	0.8 - 1.5 cubic meters	1-2 cubic yards	Free of coarse matter. Air dried. Do not use in fine turf areas. Apply with mulch blower, chip handler, or by hand.
When fiber mulch is the only available mulch during periods when straw should be used, apply at a minimum rate of 220 kg/1,000 square metes (45 lbs./1000 sq. ft.)			

1. Mulch anchoring tool (often referred to as a Krimper or Krimper Tool): This is a tractor-drawn implement designed to punch mulch into the soil surface. This method provides good erosion control with straw. It is limited to use on slopes no steeper than 3:1, where equipment can operate safely. Machinery shall be operated on the contour.
2. Fiber Mulch: A very common practice with widespread use today. Apply fiber mulch by means of a hydroseeder at a rate of 560-840 kilograms per hectare (500-750 pounds per acre) over top of straw mulch or hay. It has an added benefit of providing additional mulch to the newly seeded area.
3. Liquid mulch binders: Application of liquid mulch binders and tackifiers should be heaviest at edges of areas and at crests of ridges and banks, to prevent displacement. The remainder of the area should have binder applied uniformly. Binders may be applied after mulch is spread or may be sprayed into the mulch as it is being blown onto the soil.

The following types of binders may be used:

- a. Synthetic binders - Formulated binders or organically formulated products may be used as recommended by the manufacturer to anchor mulch.
- b. Asphalt\* - Any type of asphalt thin enough to be blown from spray equipment is satisfactory. Recommended for use are rapid curing (RC-70, RC-250, RC-800), medium curing (MC-250, MC-800) and emulsified asphalt (SS-1, CSS-1, CMS-2, MS-2, RS-1, RS-2, CRS-1, and CRS-2).

Apply asphalt at 0.5 liters per square meter (10 gallons per 1,000 square feet). Do not use heavier applications as it may cause the straw to "perch" over rills. All asphalt designations are from the Asphalt Institute Specifications.

\*Note: This particular method is not used as commonly today as it once was in the past. The development of hydraulic seeding equipment promoted the industry to turn to synthetic or organically based binders and tackifiers. When this method is used, environmental concerns should be addressed to ensure that petroleum-based products do not enter valuable water supplies. Avoid applications into waterways or channels.

4. Mulch netting: Lightweight plastic, cotton, or paper nets may be stapled over the mulch according to manufacturer's recommendations.

5. Peg and twine: Because it is labor-intensive, this method is feasible only in small areas where other methods cannot be used. Drive 200 to 250 millimeter (8- to 10-inch) wooden pegs to within 75 millimeters (3 inches) of the soil surface, every 1 meter (4 feet) in all directions. Stakes may be driven before or after straw is spread. Secure mulch by stretching twine between pegs in a criss-cross-within-a square pattern. Turn twine 2 or more times around each peg.

#### Chemical Mulches -

Chemical mulches\* may be used alone only in the following situations:

- a. Where no other mulching material is available.
- b. In conjunction with temporary seeding during the times when mulch is not required for that practice.
- c. From March 15 to May 1 and August 15 to September 30, provided that they are used on areas with slopes no steeper than 4: 1, which have been roughened in accordance with SURFACE ROUGHENING, BMP-29. If rill erosion occurs, another mulch material shall be applied immediately.

Note: Chemical mulches may be used to bind other mulches or with fiber mulch in a hydroseeded slurry at any time. Manufacturer's recommendations for application of chemical mulches shall be followed.

#### Maintenance

All mulches and soil coverings should be inspected periodically (particularly after rainstorms) to check for erosion. Where erosion is observed in mulched areas, additional mulch should be applied. Nets and mats should be inspected after rainstorms for dislocation or failure. If washouts or breakage occur, re-install netting or matting as necessary after repairing damage to the slope or ditch. Inspections should take place up until grasses are firmly established. Where mulch is used in conjunction with ornamental plantings, inspect periodically throughout the year to determine if mulch is maintaining coverage of the soil surface; repair as needed.